An Overview of Telecommunications Policy and Regulation Framework in India

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Preface

This document provides an overview of the policy and regulatory environment surrounding telecommunications in India. It summarises the legal and policy instruments that regulate telecom and internet service providers in the country. It is structured* as follows:

- General overview of acts and associated policies
- Operator licensing
- Spectrum and associated fees
- Backbone and backhaul infrastructure
- Universal service/financial support
- Gender and telecom^
- Co-operatives^

The information from this document has also been added to the LocNet Wiki, which is regularly updated to keep abreast with developments in telecom policy.

[* See appendix 2 to know more about this structure and coverage of themes/questions answered in each section. ^additional/supporting sections]

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List of Abbreviations

Abbreviation	Meaning
ADC	Access Deficit Charge
AGR	Adjusted Gross Revenue
AIU	Active Internet Users
AoA	Articles of Association
BHQ	Block Headquarter
CDMA	Code Division Multiple Access
CN	Community Network
CTDP	Comprehensive Telecom Development Plan
CUG	Closed User Group
DC3	Dynamic Coalition on Community Connectivity
DoT	Department of Telecommunications
ERNET	Education and Research Network
GMPCS	Global Mobile Personal Communication by Satellite
GP	Gram Panchayat
GSM	Global System for Mobile Communications
GSR	General Statutory Rules
ICA	International Cooperative Alliance
ICT	Information and Communications Technology
IGF	Internet Governance Forum
ILD	International Long-Distance Telephony
INSAT	Indian National Satellite System
INSAT MSS-R	INSAT Mobile Satellite System Reporting Service
IPLC	International Private Leased Circuit
ISP	Internet Service Provider

IT	Information Technology
ITU	International Telecommunication Union
IXP	Internet Exchange Point
MARR	Multi-Access Radio Relay Technology
MSCS	Multi-State Cooperative Societies
NBM	National Broadband Mission
NDCP	National Digital Communications Policy
NFAP	National Frequency Action Plan
NIXI	National Internet Exchange of India
NLD	National Long-Distance
NOFN	National Optical Fibre Network
NPW	National Policy for Women
NRRA	National Radio Regulatory Authority
NSO	Network Service Operator
OFC	Optical Fibre Cable
OLT	Optical Line Termination
PCO	Public Call Office
PDO	Public Data Office
PDOA	Public Data Office Aggregator
PMRTS	Public Mobile Radio Trunking Service
PM-WANI	Prime Minister Wi-Fi Access Network Interface
RCP	Rural Community Phone
RDEL	Rural Household Direct Exchange Line
RLAN	Radio Local Area Network
SACFA	Standing Advisory Committee On Radio Frequency Allocation
SARAL	Simplified Application for Registration and Licences
SC	Supreme Court

SDRs	Software-Defined Radios
SMRA	Simultaneous Multiple Round Ascending Method
SUC	Spectrum Usage Charges
TDSAT	Telecom Disputes Settlement and Appellate Tribunal
TRAI	Telecom Regulatory Authority of India
TSP	Telecom Service Provider
TV	Television
TVWS	TV White Spaces
UAL	Universal Access Levy
UASL	Unified Access Services Licensing
UHF	Ultra High Frequency
UL	Unified Licence
USO	Universal Service Obligations
USOF	Universal Service Obligation Fund
VNO	Virtual Network Operators
VoIP	Voice over Internet Protocol
VPT	Village Public Telephone
VSAT	Very Small Aperture Terminal
VSNL	Videsh Sanchar Nigam Limited
WAS	Wireless Access Systems
WLL	Wireless Local Loop
WPC	Wireless Planning & Coordination Wing

General Overview of Acts and Policies

[1]Primary statutes that regulate telecommunication services in India are:

1. The Indian Telegraph Act, 1885
2. The Indian Wireless Telegraphy Act, 1933
3. The Telecom Regulatory Authority of India (TRAI) Act, 1997
4. The Information Technology Act, 2000

The Indian Telegraph Act, 1885, is the primary legislation underlying the regulatory framework for telecommunications[2] in India. It prescribes the various powers of the government to operate and regulate telecommunication services in India.[3] The main objective of the Telegraph Act, when enacted in 1885, was to empower the government to install telegraph lines on private as well as public property.[4] Since then, the act has undergone multiple amendments to accommodate new communication technologies.

Definition of 'telegraph' according to the Indian Telegraph Act, 1885:

"telegraph means any appliance, instrument, material or apparatus used or capable of use for transmission or reception of signs, signals, writing, images and sounds or intelligence of any nature by wire, visual or other electro-magnetic emissions, Radio waves or Hertzian waves, galvanic, electric or magnetic means."

Section 4 of The Telegraph Act gives the central government the "exclusive privilege in respect of telegraphs and the power to grant licences."[5] That is, the central government has the power to establish, maintain, and operate telegraphs; it may also grant a licence to any person to establish, maintain, or work a telegraph within any part of India.[6] In the ongoing regime, the Department of Telecommunications (DoT) under the Ministry of Communications has been assigned the task of granting licences and approvals to different telecom players for providing telecommunication services in India.

[1] This document uses certain types of boxes, such as this yellow coloured box, for a better presentation of information. Please see appendix 1 to know more.

[2] The terms 'telecommunication' and 'telecom' (abbreviation for telecommunication) have been used interchangeably throughout the document.

[3] Seth Dua and Associates (2019). "In Brief: Telecom Regulation in India". *Lexology*. Accessible here.

[4] "Indian Telegraph Act, 1885". *CIS India*. Accessible here.

[5] See Section 4 of The Indian Telegraph Act, 1885. Accessible here.

[6] See Section 4 of The Indian Telegraph Act, 1885. Accessible here.

While the telegraph act is an overarching law relating to telegraphs in India, the Indian Wireless Telegraphy Act, 1933, was formulated specifically "to regulate the possession of wireless telegraphy apparatus."

> The Indian Wireless Telegraphy Act, 1933, defines wireless telegraphy apparatus as:
>
> "wireless telegraphy apparatus means any apparatus, appliance, instrument or material used or capable of use in wireless communication, and includes any article determined by rule made under Sec. 10 to be wireless telegraphy apparatus, but does not include any such apparatus, appliance, instrument or material commonly used for other electrical purposes, unless it has been specially designed or adapted for wireless communication or forms part of some apparatus, appliance, instrument or material specially so designed or adapted, nor any article determined by rule made under Section 10 not to be wireless telegraphy apparatus."[7]

The Indian Wireless Telegraphy Act prohibits the possession of wireless telegraphy apparatus unless a licence has been given in that regard by the telegraph authority constituted under the Telegraph Act.[8] In the current regime, the DoT is the designated telegraph authority that issues licences for possessing wireless telegraphy apparatus.

With the liberalisation of the telecom sector and entry of private players in the 1990s, the need for independent regulation became inevitable. Thus, the Telecom Regulatory Authority of India (TRAI) was established in February 1997 under the Telecom Regulatory Authority of India Act, 1997. The Act empowers TRAI to regulate telecom services, including to fix and revise tariffs for telecom services, powers which were earlier vested in the central government.[9] The TRAI Act also created a mechanism – the Telecom Disputes Settlement and Appellate Tribunal (TDSAT) – to adjudicate disputes between licensors (i.e. DoT) and licensees, between two service providers, and between service providers and a group of consumers.[10]

Telecommunications Policy Statements

Telecommunication services play an important role in socio-economic development. Thus, apart from granting licences, the DoT also formulates development-focused policies for the growth of telecommunication services across the country.[11]

[7] See Section 2 of The Indian Wireless Telegraphy Act, 1933. Accessible here.

[8] See Section 3 and Section 5 of the Indian Wireless Telegraphy Act, 1933. Accessible here.

[9] "History". *TRAI website*. Accessible here.

[10] Section 14, TRAI Act, 1997. Accessible here.

[11] "Profile". *Department of Telecommunications website*. Accessible here.

DoT has issued telecommunication policy statements at regular intervals. They are:

1. National Telecom Policy, 1994
2. New Telecom Policy, 1999
3. Broadband Policy, 2004
4. National Telecom Policy, 2012
5. National Digital Communications Policy, 2018

The National Digital Communications Policy (NDCP), 2018, is the most recent telecom policy statement published by the government. The policy attempts to outline a set of goals, initiatives, strategies, and intended policy outcomes to accomplish the following strategic objectives by 2022:[12]

- Provisioning of "Broadband for All"
- Creating 4 million additional jobs in the digital communications sector
- Enhancing the contribution of the digital communications sector to 8% of India's GDP from 6% in 2017
- Propelling India to the top 50 nations in the ICT Development Index of the International Telecommunication Union (ITU) from 134 in 2017
- Enhancing India's contribution to global value chains
- Ensuring digital sovereignty

NDCP 2018 and Connectivity in Rural and Remote Areas

India is predominantly a rural country with about sixty five percent[13] of its population living in rural areas. Therefore, it is important to revisit the various statutes discussed previously with regard to explicit provisions to improve connectivity in rural and remote areas.

The NDCP 2018 emphasises 'public Wi-Fi' for improving broadband connectivity both in urban as well as rural areas. One of the goals of the 'Connect India' mission, as listed in NDCP 2018, is to "enable deployment of public Wi-Fi Hotspots; to reach 5 million by 2020 and 10 million by 2022."[14] NDCP mentions the promotion of open public Wi-Fi access through Wi-Fi/public data office aggregators (PDOA) and public data offices (PDO) as a strategy to catalyse investments and innovation in the digital communications sector.[15] The Prime Minister Wi-Fi Access Network Interface (PM-WANI) initiative was launched in December 2020 by DoT to realise the NDCP's goal of creating a robust digital communications infrastructure through the deployment of public Wi-Fi hotspots.[16]

[12] Reproduced from Section 1, NDCP 2018, p. 15. Accessible here.

[13] World Bank Staff (2020). "Rural Population (% of total population)". *World Bank.* Accessible here.

[14] See "2022 Goals" in Section 1, NDCP 2018. Accessible here.

[15] See (b) (vi) in Section 2.1, NDCP 2018, p. 9. Accessible here.

[16] "A brief on Prime Minister Wi-Fi Access Network Interface". *DoT.* 9 December 2020. Accessible here.

As part of the "Connect India" mission, the NDCP provides for the establishment of the National Broadband Mission (NBM). Under the NBM, various initiatives have been suggested to increase connectivity in rural and remote areas. For example, under the 'BharatNet' initiative, NDCP aims to provide 1 Gbps (upgradeable to 10 Gbps) internet connections to 2.5 lakh (0.25 million) gram panchayats (GPs) across India using optical fibre cables.[17] The 'GramNet initiative' aims to provide all rural development institutions with 10 Mbps (upgradeable to 100 Mbps) internet connections. To increase last-mile connectivity, the 'Jan Wi-Fi' initiative aims to establish 2 million Wi-Fi hotspots.[18]

NDCP 2018, in its goal to improve connectivity, emphasises the inclusion of uncovered areas and digitally deprived segments of society (women, persons with disability, marginalised communities, etc.).[19]Even though the NDCP 2018 recognises wireless spectrum as a key natural resource for public benefit, it does not explicitly mention the rights of indigenous people over the use of such natural resources.[20]

"Community networks" or "local networks", which have the potential to help expand connectivity in remote regions, are not explicitly mentioned in the NDCP document.

What are 'community networks (CNs)' ?

- CNs may be defined as "an alternative and complementary approach to the traditional commercial model wherein internet connectivity is not sold to end-users – instead, users effectively club together to establish connectivity between themselves, and then may use their collective bargaining power to purchase capacity to the rest of the Internet."[21] CNs are based on a 'bottom-up' approach instead of the classic telecom-operator-driven 'top-down' approach.

- The IGF Dynamic Coalition on Community Connectivity (DC3) in the 'Declaration on Community Connectivity' describes CNs as follows: "Community networks are structured to be open, free, and to respect network neutrality. Such networks rely on the active participation of local communities in the design, development, deployment, and management of shared infrastructure as a common

[17] Gram panchayat (also known as village council) is the lowest administrative unit of multi-tier federalism in India. A gram panchayat comprises one or more villages (generally 2-3 villages). The BharatNet connection is given at the gram panchayat office.

[18] See Section 1.1, NDCP 2018, p. 15. Accessible here.

[19] Section 1.4, NDCP 2018. Accessible here.

[20] Section 1.2, NDCP 2018. Accessible here.

[21] Reproduced from Ritu Srivastava (2017). "Community Networks: Regulatory Issues and Gaps – Experiences from India". *Published by ISOC and DEF.* Accessible here.

resource, owned by the community, and operated in a democratic fashion. Community networks can be operationalised, wholly or partly, through individuals and local stakeholders, NGO's, private sector entities, and/or public administrations."[22]

- In India, a few examples of community-based connectivity models are Gram Marg, Airjaldi, and the Digital Empowerment Foundation (DEF) - Wireless for Community Initiative.
- To know more about CNs, please visit these pages: APC's community network page , Community Networks: the Internet by the People, for the People, Dynamic Coalition on Community Connectivity (DC3) page.

[22] Section 12.3, "Declaration on Community Networks". *Comconnectivity*. Accessible here.

Operator Licensing

The operator licensing framework in India dates back to The Indian Telegraph Act, 1885. Section 4 of the Telegraph Act gives the central government the power to grant a licence "to any person to establish, maintain, or work a telegraph within any part of India."[23]

Although the provision for licensing has been present since 1885, the government had a complete monopoly over telecommunications (establishment, operation, etc.) until the early 1990s.[24] It was only in 1992 that the government first allowed licensing in the telecom sector when it invited telecom players to bid for licences for cellular services across the four metros (Delhi, Mumbai, Chennai, Kolkata). Listed below (Table 1) are the major landmarks in the history of telecom licensing in India.

Table 1: Major Landmarks in the History of Telecom Licensing in India

Year	Event in the History of Telecom Licensing
1991	The government allowed private telecom companies to manufacture telecom switches for telephone exchanges.
1992	DoT invited bids for licences for operating cellular services across the four metros. The DoT offered two licences per metro city.
1994	The government passed the National Telecom Policy, which laid out specific criteria for private operators who wish to enter the Indian telecom sector.
1995	DoT invited bids for cellular licences and wireline licences. Spectrum was bundled with telecom service provider licences. To facilitate licensing, the country was divided into 21 circles (excluding four metros), which were categorised as A, B, or C based on their potential to generate revenue.
1998	Internet services were rolled out in 1995 by Videsh Sanchar Nigam Limited (VSNL). In November 1998, the government opened it up to the private sector.
1999	The New Telecom Policy, 1999, allowed the migration of licensees from a fixed licence fee regime to a revenue arrangement scheme. Under the new scheme, licence fees were collected as a proportional tax on revenue. Previously, there were two operators in each circle; the 1999 Policy allowed the government to participate as the third operator in the circle.
2000	The government issued licences for national long-distance telephony (NLDO). There was no restriction on the number of operators to whom licences could be granted. The licences were issued for 20 years on a non-exclusive basis and could be extended up to 10 years once.

[23] See Section 4 of the Indian Telegraph Act, 1885. Accessible here.

[24] Snehashish Ghosh. "Licensing Framework for Telecom: A Historical Overview". *CIS India*. Accessible here.

2001	Licences for basic telephone services using a wireless local loop (WLL) were issued. This was the first time that licences were issued on a first-come-first-serve basis.
2002	DoT issued licences to private operators for international long-distance telephony (ILD) services.
2003	The Unified Access Services Licensing (UASL) regime was introduced by DoT on the recommendations of TRAI.
2007	DoT allowed issuing of licences for operating on dual technologies – CDMA and GSM. DoT also allowed a single licence for internet service providers (ISPs) but restricted the use of Voice over Internet Protocol (VoIP).
2012	The National Telecom Policy, 2012, introduced the Unified Licensing regime. Under the regime, service operators can provide converged services. The spectrum has been delinked from the licence.
2016	The government issued guidelines for issuing virtual network operator (UL-VNO) licences. By introducing UL-VNO, DoT aimed to de-link licensing of networks from the delivery of services.
2020	The government launched the PM-WANI framework that liberalises the last-mile public Wi-Fi service provision in India.

Source: Adapted from Ghosh (n.d.)[25]

The Unified Licensing Regime in India

Telecom licensing in India underwent a major transformation with the implementation of the Unified Licence (UL) regime in 2013. This regime was implemented to achieve one of the objectives envisaged in NTP 2012: "One Nation - One Licence across services and service areas."[26]

> NTP 2012 listed as one of the objectives to "simplify the licensing framework to further extend converged high quality services across the nation including **rural and remote areas**." [emphasis added][27]

NTP 2012 recognised that the evolution from analog to digital technologies has facilitated the conversion of voice, data, and video to the digital form, and these are increasingly being

[25] Adapted from Snehashish Ghosh, "Licensing Framework for Telecom: A Historical Overview". *CIS India*. Accessible here.

[26] See (12) of Section (III), NTP 2012, p. 6. Accessible here.

[27] See (11) of Section (III), NTP 2012, p. 6. Accessible here.

rendered through single networks bringing about a convergence in networks, services, and devices.[28]

> The preamble of NTP 2012 states:
>
> "it is now imperative to move towards convergence between various services, networks, platforms, technologies and overcome the existing segregation of licensing, registration and regulatory mechanisms in these areas to enhance affordability, increase access, delivery of multiple services and reduce cost."[29]

The UL regime replaced the earlier regime, where there were separate licences for different telecommunication services. In this regime, telecom players can offer all telecommunication services under one licence; service authorisation for various telecom services will have to be done separately, however.

Listed below are the basic features of unified licences:"

1. Spectrum allocation is delinked from the licences and has to be obtained separately. At present, spectrum in the 800/900/1800/2100/2300/2500 MHz bands is allocated through a bidding process. For all other services and usages, like Public Mobile Radio Trunking Service (PMRTS), the process for allocating spectrum and the associated charges shall be as prescribed by the Wireless Planning & Coordination Wing of the DoT from time to time.

2. Authorisation under a Unified Licence comprises any one or more services listed below:
    a. Unified Licence (all services)*
    b. Access Service (service area-wise)
    c. Internet Service (Category-A with all-India jurisdiction)
    d. Internet Service (Category-B with jurisdiction in a service area)
    e. Internet Service (Category-C with jurisdiction in a secondary switching area)
    f. National Long Distance (NLD) Service
    g. International Long Distance (ILD) Service
    h. Global Mobile Personal Communication by Satellite (GMPCS) Service
    i. Public Mobile Radio Trunking Service (PMRTS) Service
    j. Very Small Aperture Terminal (VSAT) Closed User Group (CUG) Service
    k. INSAT MSS-Reporting (MSS-R) Service
    l. Resale of International Private Leased Circuit (IPLC) Service

[* Authorisation for All Services UL covers all services listed in 2(b) in all service areas, 2(c), 2(f) to 2(l) above]"[30]

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[28] "Unified Licence", *DoT Website*. Accessible here; NTP 2012. Accessible here.

[29] See Preamble, NTP 2012, p. 6. Accessible here.

[30] Reproduced from "Unified Licence", *DoT Website*. Accessible here.

DoT decided to implement the UL regime in two phases. In the first phase, spectrum was delinked from licences. In the second phase, the concept of 'virtual network operators (VNO)' was introduced to facilitate delinking of network licensing from the delivery of services.[31] This allows the same network to provide various services that are independent of the network layer. This means that delivery of services can be provided by one operator and the network may be owned by a distinct operator.[32] VNO allows telecom service providers (TSPs) to utilise their networks and spectrum efficiently by allowing sharing of active (e.g., antennas, access node switches, etc.) and passive infrastructure[33] (non-electrical or civil engineering elements such as ducts, towers, masts, etc.). VNO also facilitates resale at the service level. For example, VNO allows firms to resell the internet services of telecom companies under their own brand.[34]

UL-VNO is a regime parallel to UL. It offers all authorisations available in the UL regime. In addition, it offers authorisation for 'Access Services Category B', wherein the service area is a district of a state/union territory.[35] Listed below are the basic features of UL-VNO:"

1. VNOs are treated as extensions of network service operators (NSOs) or TSPs. They are not allowed to install equipment interconnecting with the networks of other NSOs.

2. The applicant can apply for UL-VNO along with VNO authorisation for any one or more services below:

    a. Unified Licence VNO (all services)
    b. Access Service (service area-wise)
    c. Internet Service (Category-A with all-India jurisdiction)
    d. Internet Service (Category-B with jurisdiction in a service area)
    e. Internet Service (Category-C with jurisdiction in a secondary switching area)
    f. National Long Distance (NLD) Service
    g. International Long Distance (ILD) Service
    h. Global Mobile Personal Communication by Satellite (GMPCS) Service
    i. Public Mobile Radio Trunking Service (PMRTS) Service
    j. Very Small Aperture Terminal (VSAT) Closed User Group (CUG) Service
    k. INSAT MSS-Reporting (MSS-R) Service
    l. Resale of International Private Leased Circuit (IPLC) Service (No more authorisation for resale of IPLC is being granted now, except for the applications under process)

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[31] "Guidelines for Grant of Unified Licence (Virtual Network Operators)", dated 31 August 2018. Accessible here.

[32] "Guidelines for Grant of Unified Licence (Virtual Network Operators)", dated 31 August 2018. Accessible here.

[33] To know more about active and passive infrastructure in telecom, please see this video.

[34] PTI, "DoT Cancels 71 Letters of Intent for Providing Net Service as Virtual Network Operators. *Economic Time*s. 1 October 2021. Accessible here.

[35] TRAI (2020). "Consultation Paper on Enabling Unbundling of Different Layers Through Differential Licensing." *TRAI*. Accessible here.

m. Access Services Category B* (This is additional authorisation provided in UL-VNO)"[36]

The licensing framework for internet services allows three authorisation options under the UL/UL-VNO regimes: Category-A (All-India/national), Category-B (telecom circle/licensed service area), and Category-C (secondary switching area). Thus, through three different authorisations, telecom operators have the flexibility to procure a licence depending upon their scale (area) of operations.

Technical and Administrative Requirements for Licence

At present, internet service provider licences for category 'A', 'B' and 'C' are issued under UL/UL-VNO. Only an Indian company registered under the Indian Companies Act, 2013, can apply for UL and UL-VNO, except for Access Service Category B authorisation under UL-VNO.[37]

One company can have only one UL/UL-VNO. However, the applicant can apply for authorisation for more than one service or service area subject to fulfilment of all the conditions of entry.

Important resources to understand UL and UL-VNO licence requirements in detail:

1. DoT's Guidelines for Grant of Unified Licence[38]
2. DoT's Guidelines for Grant of Unified Licence (Virtual Network Operators)[39]
3. The list of documents required for grant of UL/authorisation for additional services under UL can be found here (refer Appendix 3 of this document).
4. The applicant companies need to submit the application online on SARAL(Simplified Application for Registration and Licences) SANCHAR portal.

Licensing Fees

According to DoT's Guidelines for Grant of Unified Licence (dt. 17 January 2022), a licensee has to pay a one-time non-refundable entry fee for each service and service area before licence agreement is signed. The licensee will need to pay the fees for each subsequent authorisation. In addition to entry fees, the licensee has to pay an annual fee for each

[36] Reproduced from "Guidelines for Grant of Unified Licence (Virtual Network Operators)", dated 31 August 2018. Accessible here.

[37] This authorisation under UL-VNO can be applied for by an Indian company or an organisation registered under the Shop and Establishment Act (partnership firms, proprietorship firms, etc.) or a legal person.

[38] Latest UL guidelines were issued on 17 January 2022. It included M2M and Audiotex services.

[39] Latest UL-VNO guidelines were issued on 17 January 2022. It included M2M and Audiotex services.

authorised service separately.[40] The licence fee is calculated as a percentage of adjusted gross revenue (AGR). At present, the licence fee is 8% of the AGR; it is inclusive of the Universal Service Obligation (USO) Levy, which is 5% of the AGR.[41]

Table 2 below summarises the processing fees, entry fees, bank guarantees (BG), minimum paid-up capital, and net worth requirements for applying for a UL:

Table 2: UL–Details of the Minimum Required Equity, Minimum Net Worth, Entry Fee, Performance BG, Financial BG, and Application Processing Fee for Various Service Authorisations[42][43]

Sl. No.	Service	Minimum Equity in INR (USD)	Minimum Net Worth in INR (USD)	Entry Fee in INR (USD)	Performance Bank Guarantee (PBG) in INR (USD)	Fixed Bank Guarantee (FBG) in INR (USD)	Application Processing Fee in INR (USD)
1	UL (all services)	25,00,00,000 (USD 33,31,092)	25,00,00,000 (USD 33,31,092)	15,00,00,000 (USD 19,98,655)	44,00,00,000 (USD 58,62,722)	8,80,00,000 (USD 11,72,544)	1,00,000 (USD 133)
Service authorisation–wise requirements							
1	Access Service (telecom circle/ metro area)	2,50,00,000 (USD 3,33,109)	2,50,00,000 (USD 3,33,109)	1,00,00,000 (USD 133244) and INR 50,00,000 for NE & J&K	2,00,00,000 (USD 2,66,487)	40,00,000 (USD 53,297)	50,000 (USD 666)
2	NLD (national area)	2,50,00,000 (USD 3,33,109)	2,50,00,000 (USD 3,33,109)	2,50,00,000 (USD 3,33,109)	50,00,000 (USD 66,622)	1,00,00,000 (USD 1,33,244)	50,000 (USD 666)
3	ILD (national area)	2,50,00,000 (USD 3,33,109)	2,50,00,000 (USD 3,33,109)	2,50,00,000 (USD 3,33,109)	50,00,000 (USD 66,622)	1,00,00,000 (USD 1,33,244)	50,000 (USD 666)

[40] Section (3)(i), "DoT Guidelines on UL 20-577/2016-AS-I (Vol III)" dated 17 January 2022. Accessible here.

[41] Section 18.2, "Licence Agreement for Unified Licence" dated 17 January 2022. Accessible here.

[42] Annexure I, "DoT Guidelines on UL 20-577/2016-AS-I (Vol III)" dated 17 January 2022. Accessible here.

[43] Approximately 1 USD= 75 INR, based on exchange rates on 28 Feb, 2022.

4	VSAT (national area)	Nil	Nil	30,00,000 (USD 39,973)	10,00,000 (USD 13,324)	6,00,000 (USD 7,995)	50,000 (USD 666)
5	PMRTS (telecom circle/ metro)	Nil	Nil	50,000 (USD 666)	20,000 (USD 266)	20,000 (USD 266)	15,000 (USD 200)
6	GMPCS (national area)	2,50,00,000 (USD 3,33,109)	2,50,00,000 (USD 3,33,109)	1,00,00,000 (USD 1,33,244)	50,00,000 (USD 66,622)	20,00,000 (USD 26,649)	50,000 (USD 666)
7	INSAT MSS-R (national area)	Nil	Nil	30,00,000 (USD 39,973)	40,000 (USD 533)	40,000 (USD 533)	50,000 (USD 666)
8	ISP-A (national area)	Nil	Nil	30,00,000 (USD 39,973)	40,00,000 (USD 53,297)	2,00,000 (USD 2,665)	50,000 (USD 666)
9	ISP "B" (telecom circle/metro area)	Nil	Nil	2,00,000 (USD 2,665)	2,00,000 (USD 2665)	20,000 (USD 266)	15,000 (USD 200)
10	ISP "C" (SSA)	Nil	Nil	20,000 (USD 266)	10,000 (USD 133)	2,000 (USD 27)	10,000 (USD 133)
11	Resale IPLC (National Area)	2,50,00,000 (USD 333109)	2,50,00,000 (USD 3,33,109)	1,00,00,000 (USD 1,33,244)	2,00,00,000 (USD 2,66,487)	1,00,00,000 (USD 1,33,244)	50,000 (USD 666)

Source: Adapted from DoT Guidelines for UL dated 17 January 2022

Similarly, table 3 summarises processing fees, entry fees, bank guarantees (BGs), minimum paid-up capital, and net worth requirements for UL-VNO:

Table 3: UL-VNO –Details of Minimum Required Equity, Minimum Net Worth, Entry Fee, and Application Processing Fee for Various Service Authorisations

Sl. No.	Service Authorisation(s) (VNO)	Minimum Equity in INR (USD)	Minimum Net Worth in INR (USD)	Entry Fee in INR (USD)	FBG in INR (USD)	Application Processing Fee in INR (USD)
1	UL (VNO - all services)	10,00,00,000 (USD 13,32,437)	10,00,00,000 (USD 13,32,437)	7,50,00,000 (USD 9,99,328)	4,40,00,000 (USD 5,86,272)	1,00,000 (USD 1,332)

2	Access Service (telecom circle/ metro area)	1,00,00,000 (USD 1,33,244)	1,00,00,000 (USD 1,33,244)	50,00,000 (USD 66,622) ; 25,00,000 (USD 33,311) for NE & J&K	20,00,000 (USD 26,649)	50,000 (USD 666)
3	NLD (national area)	1,00,00,000 (USD 13,3244)	1,00,00,000 (USD 13,3244)	1,25,00,000 (USD 1,66,555)	50,00,000 (USD 66,622)	50,000 (USD 666)
4	ILD (national area)	1,00,00,000 (USD 1,33,244)	1,00,00,000 (USD 1,33,244)	1,25,00,000 (USD 1,66,555)	50,00,000 (USD 66,622)	50,000 (USD 666)
5	VSAT (national area)	Nil	Nil	15,00,000 (USD 19,987)	3,00,000 (USD 3,997)	50,000 (USD 666)
6	PMRTS (telecom circle/metro)	Nil	Nil	25,000 (USD 333)	10,000 (USD 133)	15,000 (USD 200)
7	GMPCS (national area)	1,00,00,000 (USD 66,622)	1,00,00,000 (USD 66,622)	50,00,000 (USD 66,622)	10,00,000 (USD 13,324)	50,000 (USD 666)
8	ISP “A” (national area)	Nil	Nil	15,00,000 (USD 19,987)	1,00,000 (USD 1,332)	50,000 (USD 666)
9	ISP “B” (telecom circle/metro area)	Nil	Nil	1,00,000 (USD 1,332)	10,000 (USD 133)	15,000 (USD 200)
10	ISP “C” (SSA)	Nil	Nil	10,000 (USD 133)	1,000 (USD 13)	10,000 (USD 133)
11	Resale of IPLC (national area)	1,25,00,000 (USD 1,66,555)	1,25,00,000 (USD 1,66,555)	50,00,000 (USD 66,622)	10,00,000 (USD 13,324)	50,000 (USD 666)
12	Access Services Category B (districts)	-	5,00,000 (USD 6,662)	1,65,000 (USD 2,199)	20,000 (USD 266)	10,000 (USD 133)

Source: Adapted from DoT Guidelines for UL-VNO dated 17 January 2022

PM-WANI and Licensing for Wi-Fi services

Prime Minister’s Wi-Fi Access Network Interface (PM-WANI) was launched by the DoT in December 2020 with the stated objective “to proliferate broadband through Public Wi-Fi”.[44] PM-WANI liberalises the licensing requirements for public Wi-Fi networks in India. Under the

[44] “A brief on PM-WANI initiative”. *DoT.* 9 December 2020. Accessible here.

WANI framework, it is envisaged that last mile broadband connectivity, where the consumer accesses broadband services, will be through a network of public Wi-Fi access points.[45] It is envisaged that the backhaul requirement for these Wi-Fi access points will be met by procuring internet bandwidth from the licensed telecom service providers /internet service providers .[46]

PM-WANI is based on an “unbundled and distributed model". In the integrated model: authentication, authorization, accounting, aggregation, and service provisioning is done by the same entity, whereas in the unbundled & distributed model all these functions are performed by different entities. Based on this model, the PM-WANI ecosystem has different entities for various functions: Public Data Office (PDO), Public Data Office Aggregator (PDOA), App Provider, and Central Registry. The table below (table 4) provides the name of entities in the PM-WANI framework, their functions, licensing requirements, registration requirements, fees, etc.

Table 4: Entities in the PM-WANI: Functions, licensing requirements, registration requirements and fees

Entity	Functions	Licence Required	Registration Required	Registration Requirements	Registration Fees
PDO	Provide last-mile connectivity (establish, maintain, and operate PM-WANI compliant Wi-Fi access points)	None	No	N.A. (any entity including an individual, shop-owner, associations, tea-stall owners, etc. can be a PDO)	N.A.
PDOA	Aggregation services to PDOs (authorization, accounting)	None	Yes	any company registered under Companies Act, 2013 following FDI norms	No
App Provider	Develop an app to register users and discover WANI compliant hotspots in the proximity. Authenticate potential broadband users.	None	Yes	any company registered under Companies Act, 2013 following FDI norms	No

Source: Author’s compilation from official documents

[45] “Wi-Fi ACCESS NETWORK INTERFACE (WANI) and Framework and Guidelines for Registration”.*DoT*. Accessible here.

[46] “Wi-Fi ACCESS NETWORK INTERFACE (WANI) and Framework and Guidelines for Registration”.*DoT*. Accessible here.

Unified Licensing vis-à-vis PM-WANI

The UL regime was designed to regulate the service providers operating under an integrated model. For the unbundled and distributed model under PM-WANI, the UL regime was not suited and a separate licensing framework was developed with registration requirements for different entities. However, this seperate framework is limited to Wi-Fi access points only.

Table 5 provides a comparison of traditional unified licences under the different authorizations and the PDO/PDOA under the WANI framework.

Table 5: Comparison of scope of traditional unified licences with the different authorizations and PDO/PDOA under PM-WANI

Sl. No.	UL (Access services)	UL-VNO (Access Services)	UL (Internet Services)	UL-VNO (Internet Services)	PDO/ PDOA
1	Establish, operate and maintain telecommunication networks and telecommunication services using any technology	Establish, operate and maintain telecommunication networks parented to NSO(s) network and telecom services using any technology	Establish, operate and maintain telecommunication networks and telecom services using any technology	Establish, operate and maintain telecommunication networks parented to NSO(s) network and telecom services using any technology	Limited to Wi-Fi access points only.
2	Collection, carriage, transmission and delivery of voice and/or non-voice messages Internet telephony, internet services including IPTV, broadband services and triple play i.e. voice, video and data	Collection, carriage,transmission and delivery of voice and/or non-voice messages over licensee's & or NSO's network Internet telephony, internet services including IPTV, broadband services and triple play, i.e. voice, video and data	Internet access including IPTV, internet telephony through public internet Install, operate, and commission international internet gateway and sell international internet bandwidth to other licensed ISPs	Internet access including IPTV, internet telephony through public internet	Internet access using Wi-Fi technology only

3	Leased circuits	Leased circuits	Internet service to any VSAT service subscriber using lease circuit	Not permitted	Not permitted
4	Voice Mail/Audiotext/ Unified Messaging services, Video Conferencing	Voice Mail/Audiotext/ Unified Messaging services, Video Conferencing	Limited Unified Messaging Services	Limited Unified Messaging Services	Not permitted
5	Provide access service using wireline and / or wireless media with full mobility, limited mobility and fixed wireless access	Provide access service using wireline and / or wireless media with full mobility, limited mobility and fixed wireless access	Establish its own transmission links and 'Last Mile' linkages either on fibre optic cable or radio communication or underground copper cable	Establish its own transmission links and 'Last Mile' linkages either on fibre optic cable or radio communication or underground copper cable	Last mile linkages on Wi-Fi technology only
6	Roaming services (an operator making use of another's network in a place where it has no coverage or infrastructure of its own)[47]	Roaming services through NSO (sharing of "active" infrastructure)	Sharing of "passive" infrastructure	Sharing of "passive" infrastructure	Permissible only between two PDOAs, but no roaming outside WANI network.

Source: Adapted from TRAI (2020)[48]

[47] "Mobile infrastructure sharing". *ITU*. Accessible here.

[48] TRAI (2020). "Recommendations on Proliferation of Broadband through Public Wi-Fi Networks". *TRAI*. Accessible here.

Spectrum

Created in 1952, the Wireless Planning & Coordination Wing (WPC) of the Ministry of Communications serves as the National Radio Regulatory Authority (NRRA) of India. It is responsible for frequency spectrum management in India.[49]

The key divisions within the WPC Wing are: Licensing and Regulation, New Technology Group, and Standing Advisory Committee on Radio Frequency Allocation (SACFA). SACFA's functions include making recommendations on major frequency allocation issues such as International Telecommunication Union related issues, formulation of the frequency action plan , sorting out problems referred to the committee by various wireless users, siting clearance of all wireless installations in the country etc.[50]

What is Frequency Allocation ?

There are 41 radio communication services in total (the 41st being special service). It is desirable that these services have effective access to frequencies. For this purpose the spectrum is divided into frequency bands and each band is allocated to one or more radiocommunication services.

"The principle of designating a band for the use by specified radiocommunication services is referred to as frequency allocation."[51]

Frequency Allocation Plan

The National Digital Communication Policy, 2018, recognises spectrum as a key natural resource for public benefit to achieve India's socio-economic goals. The NDCP also lists various strategies to ensure transparency in spectrum allocations alongside optimising the availability and utilisation of spectrum.[52] Accordingly, the National Frequency Action Plan (NFAP), 2018, was formulated by DoT with the stated aim to provide a roadmap for– the availability and allocation –of wireless spectrum to facilitate the development and deployment of the next generation of wireless services in the country.

NFAP 2018 provides a broad regulatory framework that determines which frequency bands are available for different radiocommunication services, including cellular mobile services, Wi-Fi, television broadcasting, radio navigation for aircraft and ships, defence and security communications, disaster relief and emergency communications, satellite communications

[49] "WPC & SACFA", *Department of Telecommunications website*. Accessible here.

[50] "WPC & SACFA", *Department of Telecommunications website*. Accessible here.

[51] See Section 1.6, NFAP 2018. Accessible here.

[52] See Section 1.2, NDCP 2018. Accessible here.

and satellite broadcasting, and amateur services.[53] Simply put, allocation of radio-frequency spectrum to different radiocommunication services is the central theme of NFAP 2018.[54] Notably, NFAP 2018 does not attempt to list the various applications (uses) of the individual radiocommunication services that are currently authorised or may be authorised in future, thus providing a stable yet flexible regulatory framework.[55]

The latest frequency allocation table of India can be found in the National Frequency Allocation Table (NFAP), 2018.

Licensed Bands

2010 was a watershed year in spectrum management policies in India.[56] The first auction for spectrum was held in 2010: spectrum in the 2100 MHz band (3G) and 2300 MHz (BWA) was allocated through an online auction. Pre-2010, spectrum was administratively allocated by the DoT through special licences.[57] However, in its February 2012 judgement in 2G case, the Supreme Court (SC) of India quashed all such administrative allocation of spectrum; a total of 122 licences got cancelled after this judgement. The SC ruled that all natural resources, including spectrum, should be only granted through a market-related process, such as an auction.[58]

As suggested in the National Telecom Policy 2012, the UL regime delinked spectrum from licences.[59] Between 2012 and 2016, DoT conducted multiple rounds of spectrum auctions through the 'simultaneous multiple round ascending' (SMRA) method. The outcome of each round is provided in table 6 below.

Table 6: Outcomes of Spectrum Auctions, 2010–16

[53] See Section 1.1, NFAP 2018. Accessible here.

[54] See Section 1.2, NFAP 2018. Accessible here.

[55] Reproduced from Section 1.5, NFAP 2018. Accessible here.

[56] Rajat Kathuria, Mansi Kedia, Richa Sekhani, and Kaushambi Bagchi (2019). "Evaluating Spectrum Auctions in India". *ICRIER*. Accessible here.

[57] Seth Dua & Associates (2019). "In Brief: Telecoms Regulation in India." *Lexology*. Accessible here.

[58] "Union Of India & Ors vs Centre For on 2 February, 2012." *Indiankanoon*. Accessible here.

[59] See para 3.5 in Section (IV), NTP 2012. Accessible here.

Sl. No.	Year of Auction	Bands auctioned	Total Spectrum Sold (MHz)	Percentage of Spectrum Sold	Outcome
1	2010	2100 MHz (3G), 2300 MHz	465, 1320	100, 100	Both bands were completely sold.
2	2012	1800 MHz and 800 MHz	127.5	32.69	Only 1800 MHz was (partially*) sold.
3	2013	800 MHz, 900 MHz, and 1800 MHz	30	15.38	Only 800 MHz was (partially) sold.
4	2014	900 MHz and 1800 MHz	353.2	81.91	Both bands were (moderately*) sold.
5	2015	800 MHz, 900 MHz, 1800 MHz, and 2100 MHz	418.25	88.85	All bands were (moderately) sold.
6	2016	700 MHz, 800 MHz, 900 MHz, 1800 MHz, 2100 MHz, 2300 MHz, and 2500 MHz	964.8	40.97	All bands, except 700 MHz and 900 MHz, were (partially) sold.

Source: Adapted from Christopher, V.J. (n.d.)[60]
[*Note: partially and moderately are used to give a sense of quantum of spectrum sold, no strict benchmarking. Refer Christopher, V.J. (n.d.) for details on the table.]

- The spectrum holding of TSPs as on 25 February 2021 can be found here.
- The spectrum holding data sheet in this article represents the current spectrum holdings of TSPs across all 22 circles along with their liberalisation status and expiry dates.

Licence-exempt Bands

While Section 3 of the Wireless Telegraphy Act, 1933, prohibits possession of wireless telegraph apparatus without a licence, Section 4 empowers the central government to exempt persons from certain provisions of this Act. Accordingly, the DoT has come up with multiple general statutory rules (GSR) to exempt certain bands.

As discussed earlier, the NFAP provides a broad regulatory framework and identifies which frequency bands are available for different radiocommunication services. NFAP 2018, which is the most recent frequency allocation plan of India, provides for certain licence-exempt bands

[60] Adapted from V. J. Christopher. "A Short Analysis of Spectrum Auction in India". *DoT*. Accessible here.

as well, which have been approved by the central government through various rules and notifications.

Table 7: Wireless Equipments exempted from Licensing*

Sl. No.	Frequency Range	Title of the Rule	GSR No.
1	2400- 2483.5 MHz	Use of Low Power Equipment in the Frequency Band 2.4 GHz to 2.4835 GHz (Exemption from Licensing Requirement) Rules, 2005	GSR No. 45 (E) dated 28 January 2005, and subsequent amendments, if any.
2	5150–5250 MHz, 5250–5350 MHz, 5470–5725 MHz, 5725–5875 MHz	Use of Wireless Access Systems (WAS) including Radio Local Area Network (RLAN) in 5GHz (Exemption from Licensing Requirement) Rules, 2018	GSR No. 1048(E) dated 18 October 2018 and subsequent amendments, if any

Source: NFAP 2018 [61]
[*Note: Not all exempted bands are listed in this table. Only bands relevant for Wi-Fi have been provided here.]

The complete list of wireless equipment exempted from licensing can be found in the annex of NFAP 2018.

Various telecom policies brought out by the government have also stressed the need to expand the share of licence-exempt bands. The Broadband Policy, 2004, initiated the process of delicensing 2.40–2.48 GHz, 2.40–2.4835 GHz, 5.15–5.35 GHz, 5.25–5.35 GHz, and 5.15–5.25 GHz to accelerate the growth of broadband and internet access. It also talked about exploring and identifying alternative spectrum bands that are not in high usage and could be deployed for broadband services.[62]

NTP 2012 lists "de-licensing additional frequency bands for public use" as one of the objectives.[63] NDCP 2018 recognises spectrum as a key natural resource for public benefit and lists "enabling light touch licensing/de-licensing of spectrum for broadband proliferation as a strategy."[64]

[61] See Annex 1, NFAP 2018, p. 197. Accessible here.

[62] Section (3.1)(e), Broadband Policy, 2004. Accessible here.

[63] Para 22, Section III, NTP 2012. Accessible here.

[64] See (b)(vii) of Section (1.2), NDCP 2018. Accessible here.

Compared to the USA, UK, China and Brazil which have ~15,000 MHz of unlicensed spectrum across various bands (majorly across 2.4 GHz, 5 GHz, 6 GHz & 60 GHz bands), the quantum of unlicensed spectrum in India is significantly lower ~689 MHz (majorly across 2.4 GHz & 5 GHz bands).[65] India is yet to de-license the 6 GHz band and 60 GHz range in the V-band i.e, 57-71 GHz that are needed for new Wi-Fi standards (Wi-Fi 6E and WiGig).

Secondary Bands (White Spaces)

Among the telecom policies brought out by the central government, only NTP 2012 explicitly mentions white spaces in the management of spectrum. One of the strategies listed in NTP 2012 talks about promoting the use of white spaces by low-power devices, without causing harmful interference to licensed applications in specific frequency bands by deployment of software-defined radios (SDRs) and cognitive radios.[66]

What is "White Space" ?

According to Innovation Science and Economic Development Canada "White space refers to spectrum in specific frequency bands that is not being used by other licensed radio services in certain geographic areas, thus making it potentially available to support the delivery of services such as wireless broadband Internet."[67] At present , white space applications such as broadband wireless access in rural areas are focused on making use of unused spectrum in over-the-air television bands.[68]

According to Naik, G. et al., a major portion of the TV spectrum is underutilised in India The results from the Naik, G. et al, show that "even while using conservative parameters, in at least 56.27% areas in the country, all the 15 channels (100% of the TV band spectrum) are free!"[69] If deployed effectively, unused bands in TV Ultra high frequency (UHF) i.e. TV white

[65] Rekha Jain (2021). "The Economic Value of Wi-Fi Spectrum for India". *BIF.* Accessible here.

[66] See 4.9 in Section (IV), NTP 2012. Accessible here.

[67] Reproduced from "White Space," *Government of Canada website*. Accessible here.

[68] Reproduced from "White Space," *Government of Canada website*. Accessible here.

[69] Gaurang Naik, Sudesh Singhal, Animesh Kumar, and Abhay Karandikar (2014). "Quantitative Assessment of TV white White space Space in India." In *2014 Twentieth National Conference on Communications (NCC), (pp. 1–-6), IEEE*. Accessible here.

spaces (TVWS) can help boost broadband connectivity in rural and remote areas.[70] TVWS offers unique advantages such as non-line-of-sight propagation and ease of deployment.[71] TVWS spectrum can be used to improve rural connectivity in multiple ways: as an affordable backhaul option to connect Wi-Fi clusters eventually terminating into urban–suburban or village GP National Optical Fibre Network (NOFN) nodes; as an alternative to optical fibre in regions with difficult terrain; or as backhaul to unlicensed Wi-Fi operations in villages or panchayats.[72]

However, despite the advantages that TVWS offers, it is yet to see widespread deployment in India This is partially because of the lack of regulation surrounding the usage of TVWS in India.

India lies in Region 3 of the International Telecommunication Union's Radio Regulations. According to this regulation, fixed, mobile, and broadcasting services in the TV UHF band (470–585 MHz) are permitted in India.[73] As per Remark IND 16 in NFAP 2018, "part of the band 470–698 MHz would be made available for International Mobile Telecommunications (IMT) once the current and future usage of the band 470–698 MHz by the broadcasting service is finalised."[74]

The government has also assigned this spectrum band for the purpose of carrying out experiments in TVWS technology. For example, licences were issued by DoT in March 2016 to Education and Research Network (ERNET) – an autonomous body under the Telecom Ministry, power equipment–maker BHEL, IIT Bombay, IIT Delhi, IIT Hyderabad, IIIT Bangalore, Tata Advanced Systems, and the Amravati District Administration for this purpose.[75] However, on the question of allocating 470–582 MHz spectrum band for the commercial deployment of

[70] Viveka Bhandari (2018), "White Space Spectrum in India: An Untapped Opportunity for Rural Connectivity", *InvestIndia,* 9 June 2018. Accessible here.

[71] Meghna Khaturia, Sarbani Banerjee Belur and Abhay Karandikar (2017). "TV White Space Solution for Affordable Internet in India ". In *TV White Space Communications and Networks*. Accessible here.

[72] Viveka Bhandari (2018). "White Space Spectrum in India: An Untapped Opportunity for Rural Connectivity". *InvestIndia*. 9 June 2018. Accessible here; IITB, "Affordable Broadband in India using Backhaul in TV White Space." Accessible here.

[73] National Frequency Action Plan (NFAP) 2018. Accessible here.

[74] Remark IND 16 in Section 3D, NFAP 2018, p. 190. Accessible here.

[75] Viveka Bhandari (2018), "White Space Spectrum in India: An Untapped Opportunity for Rural Connectivity", *InvestIndia,* 9 June 2018. Accessible here.

TVWS technology, DoT is of the view that this spectrum band will not be de-licensed and will rather be auctioned when the ecosystem has sufficiently developed for this band.[76]

Some projects in India have used TVWS to provide rural broadband connectivity. They are:

- After being granted an experimental licence to conduct experiments in the TV UHF band, the TV White Space group, IIT Bombay, was the first in India to set up a pilot test-bed using TVWS technology for rural broadband access.[77] To scale this up, Gram Marg, a rural broadband initiative, was started by the Department of Electrical Engineering. The project uses a combination of TVWS and wireless solutions including those in 5.8 GHz point-to-point WiFi.[78]

- In 2015, Microsoft conducted pilot studies in Harisal village in Maharashtra, Srikakulam in Andhra Pradesh, and Varanasi in Uttar Pradesh under its White-Fi initiative, which uses TVWS. However, in 2017, Microsoft had to put this project on hold as it was not granted the licence to continue operating the pilot project in Harisal.[79]

Spectrum Applications, Fees, Costs, etc.

The central government prescribes spectrum usage charges for TSPs that have the licence/authorisation to provide access services.[80]

In the present scenario, companies pay spectrum usage charges (SUC) somewhere between 3–5% of their adjusted gross revenue (AGR).[81] In the case where two or more operators share the same spectrum band, they had to pay an additional 0.5 per cent of the AGR for that band as SUC.[82] However, under the New Telecom Reforms Package, 2021 announced by the DoT, no

[76] Varun Aggarwal (2018). "DoT Says No to Releasing TV White Space Spectrum, Clarifies It Is for Experiments." *The Hindu BusinessLine*. 16 June 2016. Accessible here.

[77] See the Gram Marg website. Accessible here.

[78] "Broadband Connectivity to Rural and Under-served Regions Using TV White Space Band". *IIT Bombay*. Accessible here.

[79] Viveka Bhandari (2018). "White Space Spectrum in India: An Untapped Opportunity for Rural Connectivity". *InvestIndia*. 9 June 2018. Accessible here.

[80] In exercise of powers conferred under Section 4 of the Indian Telegraph Act 1885.

[81] "TRAI Issues Spectrum Usage Charges SOP". *Telegraph India*. 18 August 2020. Accessible here.

[82] "TRAI Issues Spectrum Usage Charges SOP". *Telegraph India*. 18 August 2020. Accessible here.

spectrum usage charges will be levied for spectrum auctioned in the future[83] such as that for 5G. The condition of a minimum 3% weighted average SUC rate and SUC floor amount has also been removed through the aforementioned reforms[84]; it is being said that this move in the long run would make the SUC payments progressively towards zero for operators as they keep on buying more spectrum.[85] Under the new reforms, to encourage spectrum sharing for better utilisation and efficiency, DoT has stipulated that spectrum sharing[86] will not attract the additional 0.5% increase in AGR in the SUC rate.

The government announced 'Telecom Reforms 2021' in September 2021 to provide relief to the stressed telecom sector in India. It also included various spectrum-related reforms. The specific provisions of the reforms can be found in Telecom Reforms booklet (Volume-1 and Volume-2).

Application Forms for Wireless Spectrum

Links for different types of applications for wireless spectrum:

- Application for a Licence to Possess Wireless Receiving and/or Transmitting Apparatus in India
- Application Form to Operate Wireless Link/Network under Indian Telegraph Act, 1885
- Application for an Experimental Wireless Licence
- Application for Licence to Establish, Maintain, and Work Radio Paging Systems
- Application Form for Licence to Establish, Maintain, and Operate Wireless Telegraph Stations In India For Short Range UHF Handheld Radios
- Application Form for a Licence to Demonstrate a Wireless Transmitter or a Receiver Set

[83] As per office memorandum No: L-14047/08/2021-NTG issued by WPC, dated 08 October 2021. Accessible here.

[84] As per office memorandum No: L-14047/08/2021-NTG issued by WPC, dated 08 October 2021. Accessible here.

[85] Kiran Rathee (2021). "Spectrum charges: Dept of Telecommunications to abolish 3% floor rate". *Financial Express.* 20 September 2021. Accessible here.

[86] The latest guidelines on spectrum sharing dated 11 October 2021 can be found here.

Backhaul

National Optical Fibre Network

The BharatNet project, earlier known as the National Optical Fibre Network (NOFN), is a project of the Government of India that aims to connect 2.5 lakh GPs of India through an optical fibre network. It is often portrayed as the first pillar of the Digital India programme.[87] The BharatNet[88] project aims to bridge the connectivity gap for the 'middle-mile' by laying incremental fibre from block headquarters (BHQs) to GPs. 1,85,261 GPs have been connected with fibre of which 1,75,827 have been made service-ready (as on 27 February 2022).[89]

The BharatNet fibre can be utilised by service providers in two ways:"

1. Bandwidth utilisation: BharatNet connects gram panchayats to the block optical line termination (OLT) location. Any service provider/government agency that intends to provide its services at the GP–level may connect to BharatNet at the block optical line termination location from where its traffic is carried to the GP–level on BharatNet. At the GP, the service provider has to extend its services to end customers using its own last mile.

2. Dark fibre utilisation: Service providers may also utilise the dark fibre on the new cable laid between blocks and GPs, also called incremental cable, to extend their services to GPs. The dark fibre is available from the Fibre Point of Interconnect (with the existing fibre) to the GPs." [90]

Important resources for service providers who plan to utilise NOFN/BharatNet:

1. The tariffs for BharatNet bandwidth and dark fibre can be found here.
2. Block-wise Line Diagram for BharatNet and BBNL Dark Fibre; Lat–Long of GPs, FPOIs and OLTs for GPs under BharatNet Phase-I
3. The detailed requirements, payment procedure, etc. for BharatNet connectivity can be found here:
    a. Application Form for Bandwidth on BharatNet
    b. Application Form for Taking on Lease Dark Fibre on Incremental Cable of BharatNet

[87] "Telecom at a Glance". *DoT*. Accessible here.

[88] See also the subsection on Bharat Net in the next chapter on USOF.

[89] As on January 24, 2022. Source: *BBNL*. Accessible here.

[90] Reproduced from "BharatNet Utilisation Models," *BBNL*. Accessible here.

The Government of India, from time to time, has come up with various policies and regulations with the stated objective of strengthening and improving access to backhaul. NDCP 2018 emphasises enhancing backhaul capacity to support the development of next-generation networks like 5G.[91] Specifically, NDCP 2018 mentions promoting effective utilisation of high-capacity backhaul E-band (71-76/ 81-86 GHz) and V-band (57-64 MHz) spectrum and rationalisation of annual royalty charges for microwave links as some of the strategies to improve backhaul connectivity.[92] To establish a National Digital Grid, NDCP 2018 proposes developing an open-access, next-generation network as a sub-strategy.[93]

To facilitate sharing of telecom infrastructure, DoT issued a notification in February 2016, which permits sharing of active infrastructure among service providers.[94] The notification restricted active sharing to antenna, feeder cable, node B, radio access network (RAN), and transmission systems.[95] However, through a notification in April 2021, the DoT widened the scope of active infrastructure to give a boost to public Wi-Fi services and broadband penetration.[96] After this notification, sharing of infrastructure related to Wi-Fi equipment such as Wi-Fi router, access points, etc., and sharing of backhaul is also permitted under active infrastructure sharing.[97]

Internet Exchange Points (IXPs)

Internet exchange points (IXPs) play an important role in the modern internet as they facilitate the interconnection of various networks by providing a common peering fabric.[98]

The following table (Table 7) provides the list of IXPs operating in India.

[91] See (d)(ii) in Section 2.2, NDCP 2018, p. 20. Accessible here.

[92] See (d)(iii), Section 1.2, NDCP 2018, p. 17. Accessible here.

[93] Section 1.1 (c)(iv), NDCP 2018, p. 16. Accessible here

[94] "Telecom at a Glance". *DoT*. Accessible here.

[95] Section 33.2, amended vide DoT's letter no 20-443/2014-AS-I Pt, dated 11 February 2016, UL version dated 29 March 2016. Accessible here.

[96] Kalyan Parbat (2021). "DoT Widens Scope of Active Infra Sharing to Boost Broadband Penetration." *Economic Times*. 6 April 2021. Accessible here.

[97] See DoT's letter dated 06 April 2021 "Amendment in Unified Licence relating to infrastructure sharing and public Wi-Fi services. Accessible here.

[98] Adapted from "IXPs in India." *Indian Network Operators Group*. Accessible here.

Table 7: Internet Exchange Points in India

Name of IXP	Website	Locations
NIXI	http://nixi.in	Noida, Mumbai, Chennai, Kolkata, Bangalore, Hyderabad, Ahmedabad, and Guwahati
Mumbai IX	https://www.mumbai-ix.net	Delhi, Mumbai, Chennai, and Kolkata
Extreme IX	https://extreme-ix.org	Mumbai, Delhi, Hyderabad, Chennai, and Kolkata
AMS-IX India	https://www.ams-ix.net/in	Mumbai
IIFON	http://iifon.org	Kolkata
BharatIX	https://www.bharatix.net	Mumbai

Source: Adapted from INNOG[99]

The National Internet Exchange of India (NIXI) was set up in 2003 "for peering of ISPs among themselves for the purpose of routing the domestic traffic within the country, instead of taking it all the way to US/Abroad, thereby resulting in better quality of service (reduced latency) and reduced bandwidth charges for ISPs by saving on International Bandwidth."[100]

With regard to policy around IXPs, NDCP 2018 recognised the need to create an enabling regulatory framework to facilitate independent exchanges in India.[101] However, at present, the legal regime governing internet exchange points in India is not very clear.[102] Recently, there was a dispute between Extreme Infocom (EI), one of India's leading IXP operators, and the DoT on whether a licence is required to operate an IXP in India.[103] On the one hand, DoT in Extreme Infocom Pvt. Ltd. v. Union of India argued that IXPs do require an ISP licence under Section 4 of the Telegraph Act, as messages pass from one licensed service provider to another. On the other hand, EI argued that as it does not provide any bandwidth and it merely provides hardware and physical ports, IXPs should be excluded from the ISP licence requirement. Notably, none of the licences that are currently being offered by the DoT envisages an IXP service. Even the term 'internet exchanges' has not been used anywhere in the UL agreement.

[99] Adapted from "IXPs in India." *Indian Network Operators Group*. Accessible here.

[100] Reproduced from "About us". *NIXI website.* Accessible here.

[101] See (i) (f) in Section 2.2, NDCP 2018. Accessible here.

[102] Arvind Ravindranath (2021). "Internet Exchanges in India: A Legal Anomaly". *Ikigai Law*. Accessible here.

[103] *Extreme Infocom Pvt. Ltd. v. Union of India*, W.P. (C) No. 7804 of 2019.

Universal Service

The National Telecom Policy, 1994, the first telecom policy statement of India, mentioned the universal availability of basic telecom services to all villages as one of its objectives.[104] However, a more concrete and clearer framework for universal service was mentioned in the New Telecom Policy 1999, which had a section dedicated to Universal Service Obligations (USO).[105]

> NTP 1999 explicitly mentioned universal service as an important objective:
>
> "Strive to provide a balance between the provision of universal service to all uncovered areas, including the rural areas, and the provision of high-level services capable of meeting the needs of the country's economy; encourage development of telecommunication facilities in remote, hilly and tribal areas of the country."[106]

NTP 1999 provided that a Universal Access Levy (UAL) be charged to all operators under various licences to meet the resource requirements for meeting the USO.[107] This levy is calculated as a percentage of the revenue earned by the operators and is decided by the government in consultation with TRAI.[108] At present, the USO Levy is 5% of the AGR.[109]

To further this objective, DoT issued the Universal Service Support Policy in 2002,[110] and the USOF was constituted. USOF was accorded statutory status through the Indian Telegraph (Amendment) Act, 2003, and, subsequently, the rules for the administration of USOF, known as the Indian Telegraph (Amendment) Rules, 2004, were notified on 26 March 2004.[111]

> The definition of USO as per the Indian Telegraph Act: "Universal Service Obligation means the obligation to provide access to telegraph services to people in the rural and remote areas at affordable and reasonable prices."

NTP 2012 laid the foundation for NOFN, which is considered to be the most prominent service supported by USO. NTP 2012 provided that the optical fibre network will be laid up to the

[104] Section 2, NTP, 1994. Accessible here.

[105] See Section 6.0, NTP, 1999. Accessible here.

[106] Reproduced from Section 2.0, NTP, 1999. Accessible here.

[107] Section 6.0, NTP, 1999. Accessible here.

[108] Section 6.0, NTP, 1999. Accessible here.

[109] Section 18.2, "Licence Agreement for Unified Licence" dated 17 January 2022. Accessible here.

[110] "History", *USOF website*. Accessible here.

[111] "Universal Service Obligation Fund," *Department of Telecommunications website*. Accessible here.

village panchayat using funding from the USOF.[112] Accordingly, the Indian Telegraph Rules, 1951, was amended to insert a section on NOFN.[113]NOFN is one example of a service supported by the USOF. As per the Indian Telegraph (Amendment) Rules, 2004 (amended further in 2006 and 2008), USOF supports a range of services across six different streams.

Table 8. Services Supported by USOF

Stream of Service	Sub-Streams/Explanations	Key Projects under Each Stream and Link to the Project
Stream-I: Provision of Public Access Service	(a) Operation and maintenance of village public telephones (VPT) in the revenue villages identified as per Census 1991 and installation of VPTs in the additional revenue villages as per Census 2001; (b) provision of rural community phones (RCPs) after achieving the target of one VPT in every revenue village; if the population is more than 2,000 and no public call office (PCO) exists, a second public phone shall be installed; (c) Replacement of Multi-Access Radio Relay Technology (MARR) VPTs installed before 1 April 2002	O&M of VPTs; New VPTs Phase 1; New VPTs Phase 2; Rural Community Phones (RCPs)
Stream-II: Provision of Household Telephones in Rural and Remote Areas as May Be Determined by the Central Government from Time to Time	(a) For rural household direct exchange lines (RDELs) installed before 1 April 2002, support towards the difference in rent actually charged from rural subscribers and rent prescribed by TRAI shall be reimbursed until such time the Access Deficit Charge (ADC) prescribed by TRAI from time to time takes into account this difference. Also, following the phasing out of the ADC regime, support will be provided for a limited duration of three years for such rural wireline RDELs; (b) support for RDELs installed after 1 April 2002.	RDELs prior to 1.04.02; RDELs 1.04.03 to 31.03.05; RDELs w.e.f. 31.03.05
Stream-III: Creation of Infrastructure for Provision	The assets constituting the infrastructure for providing mobile services shall be determined by the	Mobile Infrastructure Phase 1; Left Wing Extremism (LWE) Areas; AmarNath

[112] Para 1.3 in Section IV, NTP 2012, p. 8. Accessible here.

[113] Indian Telegraph (Amendment) Rules, 2012. Accessible here.

of Mobile Services in Rural and Remote Areas.	central government from time to time.	
Stream-IV: Provision of Broadband Connectivity to Rural & Remote Areas in a Phased Manner	-	Wireline Broadband
Stream-V: Creation of General Infrastructure in Rural and Remote Areas for the Development of Telecommunication Facilities.	The items of general infrastructure to be taken up for development shall be determined by the central government from time to time.	CSC Wi-Fi Choupal; OFC for Assam; OFC for NE; OFC for NE II; National Optical Fibre Network with BBNL
Stream-VI: Induction of New Technological Developments in the Telecom Sector in Rural and Remote Areas	Pilot projects to establish new technological developments in the telecom sector, which can be deployed in rural and remote areas, may be supported with the approval of the central government.	Solar Mobile Charging Facility,; Sanchar Shakti

Source: Adapted from USOF[114]

About 49% of the USOF still remains unused. Based on the latest figures (as of 31 January 2022), total accretion is approximately INR 1,23,318 crore and total disbursement is INR 62,687 crore. The potentially available fund is INR 60,631 crore.[115]

USOF funded Rural and Remote Connectivity Initiatives

Some of the key connectivity initiatives in India that are funded through USOF are summarised below.

Bharat Net

Earlier known as National Optical Fibre Network, Bharat Net project is targeted towards improving connectivity in rural India. This project aims to connect 2,50,000 Gram Panchayats (village councils) through an optical fibre network. It was launched to fill the connectivity gap

[114] Adapted from "Schemes", *Universal Service Obligation Fund*. Accessible here.

[115] Source: "Fund Status in Table". *Universal Service Obligation Fund*. Accessible here.

between Blocks[116] and Gram Panchayats. Optical Fibre Cable (OFC) connectivity was available in state capitals, districts, till the block level. However, there existed a connectivity gap between Blocks and Gram panchayats. Under the Bharat Net project, incremental fibre is laid to fill this gap and thus bandwidth reaches till the Gram Panchayat level. However, the last mile service provision is left to internet service providers who will have non-discriminatory access to the OFC. 1,85,261 GPs have been connected with fibre of which 1,75,827 have been made service-ready (as on 27 February 2022).[117]After multiple revision of deadlines, the project is expected to be completed by 2023.

Comprehensive Telecom Development Plan[118]

The remote areas in the north-eastern states of India have limited connectivity. In order to improve connectivity in this region, the government of India, in 2014, released the Comprehensive Telecom Development Plan (CTDP) for north-eastern region. This project aims to connect 8621 villages through installation of 6000 mobile tower sites across north-eastern states. On 9 December 2020, INR 2,029 crore (approx 271,520,780 USD) were released from Universal Service Obligation Fund to provide mobile coverage to 2,374 uncovered villages (1,683 in Arunachal Pradesh and 691 in two districts of Assam).[119]

Andaman and Nicobar islands connectivity through submarine optical fibre cable

Andaman and Nicobar, a remote island situated in the Bay of Bengal, is majorly inhabited by tribal population. The Government of India through USOF funded a submarine optical fibre connectivity project which connects mainland Chennai and Port Blair and five other islands namely Car Nicobar, Little Andaman, Havelock, Kamorta and Great Nicobar Islands of Andaman & Nicobar Islands. Launched in 2018, this project was completed in 2020.[120]

Network for Insurgency Affected Areas[121]

Some regions in India are affected by insurgency, and due to which connectivity has suffered in those areas. In order to improve connectivity in such areas, the department of telecom executed a project for providing Mobile Services in 2199 locations in Andhra Pradesh, Bihar,

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[116] Approximately 200- 300 villages constitute a block which is the second level administrative unit above Gram Panchayat.

[117] As on 27 February, 2022. Source: *BBNL*. Accessible here.

[118] "Telecom at a Glance". *DoT*. Accessible here.

[119] "Cabinet approves Universal Service Obligation Fund Scheme for providing Mobile Coverage in Arunachal Pradesh and two Districts of Assam under the Comprehensive Telecom Development Plan for North Eastern Region". *Press Information Bureau*. 9 December 2020. Accessible here.

[120] "Prime Minister Shri Narendra Modi to inaugurate submarine cable connectivity to Andaman & Nicobar Islands (A&NI) on Monday 10th August". *Press Information Bureau*. 7 August 2020. Accessible here.

[121] The official documents from DoT and USOF have named these insurgency affected areas as "Left Wing Extremist (LWE)" areas.

Chhattisgarh, Jharkhand, Maharashtra, Madhya Pradesh, Odisha, Telangana, Uttar Pradesh and West Bengal, which are affected by LWE.[122]

[122] "Telecom at a Glance". *DoT*. Accessible here; "Left Wing Extremist Area (LWE) Phase I". *USOF*. Accessible here.

Gender and Telecom

India has an evident gender divide when it comes to accessing the internet. There are over 622 million active internet users (AIU) in India; about 58% of these users are male, while only 42% are female.[123] The divide is almost the same in rural and urban India: in rural India, the ratio between male to female internet users is 57:43, whereas for urban areas this ratio is 58:42.

NDCP 2018 has taken cognizance of this issue. NDCP 2018 stresses the inclusion of uncovered areas and digitally deprived sections (marginalised communities, women and persons with disabilities) by allocating finances under the USOF to address the issue.

The Draft National Policy for Women (NPW), 2016, acknowledges that the global growth in technology and information systems can have an impact on the general populace, and on women in particular, in unique ways.[124] NPW also suggests that the growth in information technology (IT) has resulted in new forms of sexual abuse, including cyber-crimes and harassment over the phone and the internet, and that regulatory frameworks have not kept pace with technological growth.[125] NPW 2016 encourages women's participation in new and upcoming industries such as information-based industries, telecommunications, etc.[126] NPW lists as a strategy to collect gender-based data through mobile phones to inform policy prescriptions.[127]NPW lays stress on encouraging girl-students and women to enter the ICT sector.[128]

Not only is the divide present among end-users, but women are also under-represented at the DoT and TRAI.

The leadership positions (chairman, member, secretary, advisor) at the Telecom Regulatory Authority of India (including the regional offices) have 19 males and only one female.[129] The leadership positions (chairman, member, secretary, advisor, director, etc.) at the Department of Telecom have 115 males and only 14 females.[130]

[123] Kantar (2020). "Report on Internet Adoption in India". *Kantar-ICUBE*. Accessible here.

[124] Para 1.4 in "Section 1. Introduction", National Policy for Women, 2016. Accessible here.

[125] Para 1.7 in "Section 1. Introduction", National Policy for Women, 2016. Accessible here.

[126] (i) (Service Sector) (III) in Section 5, National Policy for Women, 2016, p. 10. Accessible here.

[127] (ii) (Science and Technology) (III) in Section 5, National Policy for Women, 2016, p. 10. Accessible here.

[128] (v) (Science and Technology) (III) in Section 5, National Policy for Women, 2016, p. 10. Accessible here.

[129] As on October 20, 2021. "Who's Who," *Telecom Regulatory Authority of India*. Accessible here.

[130] As on October 20, 2021. "Who's Who," *Telecom Regulatory Authority of India*. Accessible here.

Co-operatives*

[*Note: This is an additional/ supporting section in this document. Though not directly related to telecom in India, it is important to explore co-operatives as a means to improve connectivity in rural and remote regions. This review on cooperatives is important especially from the point of view of community networks and small networks]

> India's National Policy on Cooperatives follows the International Cooperative Alliance's (ICA) definition of cooperatives. It defines cooperatives as : "Cooperative is an autonomous association of persons united voluntarily to meet their common economic, social and cultural needs and aspirations through a jointly-owned and democratically-controlled enterprise."[131]

Cooperatives in India are not a new phenomenon: even though formal cooperative structures came into existence after the passing of a law on cooperatives in 1904 (i.e, Cooperative Credit Societies Act, 1904) , the concept of cooperation and cooperative activities were already in practise in different regions of India.[132] Cooperatives in India originally evolved in agriculture and allied sectors as a mechanism for pooling together the meagre resources of people to avail the benefits of economies of scale.[133]

> The Cooperative Societies Act, 1912, is the primary legislation governing cooperative societies in India. A cooperative society can be formed in India under the provisions of this act.

As cooperatives fall under the state list, each state in India has its own laws for governing cooperatives. In the current legal framework, national cooperatives and cooperatives having multi-state operations are governed by the central act, whereas cooperatives operating within a particular state are governed by the cooperative societies act of the respective states (for example, the Maharashtra Co-Operative Societies Act, I960).[134]

For state cooperatives, a cooperation-commissioner and the registrar of societies serve as the governing authorities of cooperatives, whereas for multi-state cooperative societies (MSCS), the central registrar of societies is the controlling authority. However, in most cases, the state registrar takes action on the central registrar's behalf.[135]

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[131] Department of Agriculture and Cooperation (2002), " National Policy on Cooperatives". Accessible here.

[132] Section 44.1 of Chapter 44, *MOSPI Yearbook*. Accessible here.

[133] Para 1.1 in Section 1, Department of Agriculture and Cooperation (2002), " National Policy on Cooperatives".

Accessible here.

[134] "Key Figures". *#coops4dev*. Accessible here.

[135] Parthasarathi Biswas (2021). "Explained: Why a Ministry of Cooperation." *The Indian Express*. 15 July 2021.

Accessible here.

India does not have sector-specific laws for cooperatives. This means that all types of cooperatives, such as agricultural, consumer credit, and others, are governed by a single law.[136]

In the most recent development around cooperatives in India, the government in 2021 announced the creation of a separate Ministry of Cooperation.[137] This ministry will provide a separate administrative, legal, and policy framework for strengthening the cooperative movement in the country; streamline processes to improve ease of doing business for co-operatives; and enable the development of multi-state co-operatives (MSCS).[138]

UL and UL-VNO can be applied only by Indian companies (except for Access Service Cat B authorisation under UL-VNO, which can be applied for by Indian companies, partnership firms, proprietorship firms, shops and establishments, and legal persons)[139] Thus, in the current UL licensing regime in India, a cooperative society is not eligible for an ISP licence as only a company registered under the Companies Act, 2013, can apply for an ISP-A, ISP-B, or ISP-C authorisation. [emphasis added]

[136] "India". *#coops4dev*. Accessible here.

[137] "Modi Government Creates a New Ministry of Cooperation". *PIB Delhi*. 6 July 2021. Accessible here.

[138] "Modi Government Creates a New Ministry of Cooperation". *PIB Delhi*. 6 July 2021. Accessible here.

[139] See (3) UL FAQ. Accessible here.

APPENDIX 1: Manual for Reading the Document

- At certain places, the text has been hyperlinked for quick redirection to the stated resource/reference. The hyperlinked text appears like this.
- This document contains boxes to better represent and highlight facts. These boxes are of five kinds:

EMPHASIS BOX:
This box contains important sentences including definitions, provisions of an act, etc.

TIP and RESOURCE BOX:
This box contains hints/tips/tricks on finding information. This box also contains important resources such as Application Forms, Guidelines, etc.

GOOD PRACTICES BOX:
This box contains examples of good practices. It includes provisions of the act/policy conducive for small/local operators.

BAD PRACTICES BOX:
This box contains examples of bad practices. It includes provisions of the act/policy non-conducive for small/local operators.

QUESTION BOX:
This box contains questions to be considered.

APPENDIX 2. Section-wise Checklist

This document summarises the legal and policy instruments that regulate telecom and internet service providers in India. Its framework is drawn from the Policy and Regulation for Community Networks (LOCNET) project by the Association for Progressive Communications[140] Rural and remote connectivity, local operators, community networks have been given special focus in writing this document. This document has attempted to cover and answer the topics and questions (including LocNet Wiki questions), as listed below. While reading the document, expect answers to the following questions:

General Overview of Policies and Acts

- Is there any mention of the rights of indigenous populations with regards to sovereignty over their land and/or the use of other natural resources (i.e., spectrum)?
- Which mechanisms has your administration implemented for the provision of telecommunication services/ICTs in rural and remote unattended or underserved areas? (ITU-D 19)
- Has your country shown progress or taken any action in implementing regulations to integrate small or non-profit operators to provide broadband connectivity to users in rural and remote areas? If yes, please describe the case and indicate sources for further information. (ITU-D 19)
- Does your country have plans to implement any of these measures? If yes, please describe the case and indicate sources for further information. (ITU-D 19)
- Has your country considered or implemented regulatory measures to allow small, non-profit, or community operators access spectrum resources and backbone networks? If yes, please describe the case and indicate sources for further information. (ITU-D 19)
- Has your country published any studies or statistical information about small and non-profit community operators in rural and remote areas? (ITU-D 19)

Operator Licensing

- Has your administration considered specific licensing mechanisms that facilitate the deployment of broadband services in rural and remote areas? (ITU-D 19)
- Does your country have licences to address specifically underserved areas, such as rural operator licence, social licence, small operator licence, and community operator licence? (ITU-D 19)
- Is there a specific licence for the provision of services in remote or underserved areas in your country? (ITU-D 19)
- What kinds of operator licences are there? Unified?
- Are there licences for small operators?
- Do ISPs have specific licences?

[140]Also see APC (2020) "Expanding the Telecommunications Operators: Ecosystem Policy and Regulatory Guidelines to Enable Local Operators", *Association for Progressive Communications*. Accessible here.

- What kinds of organisations qualify for licence exemption?

Spectrum

- Updated national frequency plans
- Whether a given administration offers incentives, including lower rates of payment for the use of spectrum, when it is to be used in isolated and underserved areas?
- Guiding questions for filling up spectrum tables

Backhaul

- Policies and regulations related to backhaul infrastructure
- Government's stated position on open access
- Availability of backhaul pricing information

Universal Service

- Whether universal service funds have been used to support community networks in your country.
- Does your country offer support for local entrepreneurs who are implementing sustainable business models for the development of rural communications, either through the Universal Service Fund or other initiatives?

Gender and Telecom

- Is there a digital divide between different genders?
- National policy for women

Co-operatives

- Identify cooperative legislation and any associated documentation or resources available to cooperatives.
- Also, if there are existing telecommunications and/or broadband cooperatives in your country, please link to them.

APPENDIX 3. List of Documents Required for Different Authorisations under UL

Sl. No.	Documents required	Detail	Sample Copy
1.	Copy of certificate of incorporation along with articles of association (AOA) and memorandum of association (MOA)	(a) Certificate of Incorporation along with a complete copy (all pages) of AoA and MoA to be submitted. Every page to be certified by the company secretary/ statutory auditor and countersigned by authorised signatory of the company. (b) Provision of respective service should exist in main object clause of MoA	http://10.192.20 8.31:8088/circul ar/licenses_issue d/APPENDIX II.pdf
2	Non-refundable processing fee	(a) Processing fee to be submitted as per the table in this Help document through Bharatkosh (https://bharatkosh.gov.in/).	
3	The original power of attorney by resolution of the board of directors that the person signing the application is authorised signatory on stamp paper	(a) The Power of Attorney in favour of the authorised signatory on a non-judicial stamp paper of INR 100 to be given through board resolution. To be signed by a person other than in whose favour it is being given. It should bear the seal of the company. It should be notarised. It should have the specimen signature of the authorised signatory. (b) A separate board resolution on the company letterhead duly signed by the board of directors is also to be submitted.	Appendix-III and Appendix-IV
4	Details of promoters/partners/shareholders in the company	To be submitted on company letterhead and signed by authorised signatory as per para 7(a) of the application Form. Complete break up of 100% equity to be submitted. In case another company is having some shareholding in the applicant company, then a complete breakup of shareholding of that company is also to be given. The document is to be digitally signed.	Appendix-V
5	Total equity detail certificate	To be submitted as per para 7(b) of the application form. Indian and foreign equity break up to be given. To be certified by the company secretary/statutory auditor and countersigned by the authorised signatory of the company. The document is to be digitally signed.	Appendix-VI

6	Certified copy of the approval of Govt. of India for foreign equity (applicable only if FDI > 49%)	If the company has foreign equity of more than 49%, then approval is to be submitted duly certified by the company secretary/statutory auditor and countersigned by the authorised signatory of the company. The document is to be digitally signed.	Appendix-VII
7	Board resolution regarding appointment of the statutory auditor along with specimen signature of the CA	If the certificate of incorporation, MoA, AoA, and equity certificate are certified by statutory auditor (CA), then a board resolution on the company letterhead is to be submitted for the appointment of statutory auditor along with the specimen signature of the CA. To be digitally signed by the authorised signatory.	Appendix-VIII
8	The registered office address in the application form should be the same as mentioned in the certificate of incorporation. If the registered office has been changed, then a certified copy of Form INC-22/Form 18 with GAR and challan copy (to be certified by the company secretary/statutory auditor) is to be submitted.		Appendix-IX

Source: https://saralsanchar.gov.in/circular/licenses_issued/UL_FAQ.pdf